Statistical Inference Methods in Bioengineering

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Course Information

General Information

- Course code: BM5033
- Credits: 2
- Segment: 1-4 of Aug-Dec '2025-26
- Schedule: Slot-D (Mon 12h00-12h55, Tue 09h00-09h55, Fri 11h00-11h55)
- Evaluation: Mid-sem exams (10% + 20% + 20%), Final exam (30%), Short project (20%)

References

- Biostatistical Analysis by Jerrold Zar
- Medical Statistics by Kirkwood and Sterne
- Statistics for Biologists, A collection (`https://www.nature.com/collections/qghhqm`)

Schedule of exams

1st (1 hour)	12 August in class
2nd (1 hour)	02 September in class
3rd (1 hour)	22 September in class
Final (2 hours)	13 October at 1800

Course webpage: `http://people.iith.ac.in/suhailr/bm5033`

All course material including notes, slides, handouts, Python/R-notebooks, assignments, solutions, etc. will be uploaded there

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  - **biological variability**
  - **precision of the equipment**
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- Some objectives of this course are to understand
  - **the role of such uncertainties quantitatively**
  - **that statistics is NOT to be done when the experiment is over but during its design**
  - **how to represent the data**
  - **drawing conclusions from the experiments**

What is this course not about?

- A mathematical juggernaut
- A training in statistical analysis softwares
- how to show statistical significance in the data

Modus operandi

- We will take a practical approach
- The course will NOT run at a uniform pace: **we will breeze through some topics and for others we will take time.**
- All of you might not be comfortable with same topics. Therefore, **discussion hour**.
- In class we will cover some theoretical aspect of a topic followed by a couple of examples.
- This will be followed by lab sessions (in class) with relatively larger data
- ~~Assignments will **almost always** be statistical analysis and representation of data~~ There are no assignments in this course. Practice problems will be given at regular intervals.
- Mid-semester exams will be short calculation-based or an analysis of a small dataset. The exact nature of each exam will be announced before that exam.
- In exams you can bring one A4 (or equivalent) sheet of paper with anything **hand-written** on it.

Course policies and suggestions

- **Attendance**: Attendance will be marked in each class but it will not contribute to the evaluation.
- **Missing exams**: On missing an exam due to a medical emergency you will be allowed to write a make-up exam on producing a medical certificate from the institute health center. Missing an exam due to any other reason (including being away for any extra-curricular activities) will result in no marks.
- The best way to follow the course is to work out the details of the topics discussed in each class by yourself after the class.
- Since there are no assignments in the course. You are advised to take the practice problems seriously and solve them at a regular interval. This will also make it easier for you take help during discussion hour. Solving all of them the night before the exam will not be very fruitful.
- There will be one discussion hour each week for clarification of doubts and practice problems. Take advantage of that.

An experiment

- We want to know if the dominant hand is faster than the non-dominant hand.
- We want to know if there is any effect of eye closure on balance.
- We want to know if counting numbers backward slows down walking speed.